

ABSTRACT

- 5 The invention relates to semiconductor device fabrication and more specifically to a method and material for forming of shallow trench isolation structures in integrated circuits. A silica dielectric film is formed by preparing a composition comprising a silicon containing pre-polymer, optionally water, and optionally a metal-ion-free catalyst selected from the group consisting of onium compounds and nucleophiles. The substrate is then coated with the composition to form a
10 film. The film is then crosslinked to produce a gelled film. The gelled film is then heated at a temperature of from about 750 °C to about 1000 °C for a duration effective to remove substantially all organic moieties and to produce a substantially crack-free silica dielectric film.